WHAT WE CLAIM IS:

1. A process for the synthesis of phenol and acetone starting from cumene hydroperoxide, comprising the following steps:

a) pretreating the starting cumene hydroperoxide with acidic resins, to obtain cumene hydroperoxide free of inorganic cations;

b) decomposing the cumene hydroperoxide free of inorganic cations originating from the step (a) in the presence of acidic resins, to yield phenol and acetone.

2. A process according to claim 1, wherein said step a) of pretreating cumene hydroperoxide with the acidic resins is performed at a temperature such as not causing a substantial decomposition of CHP.

3. A process according to claim 1, wherein said step a) of pretreating the cumene hydroperoxide with the acidic resins is performed at a temperature below 20°C.

4. A process according to claim 1, wherein said step b) of decomposing the cumene hydroperoxide is performed at a temperature comprised between 35°C and 90°C, preferably between 40°C and 50°C.

5. A process according to claim 1, wherein said acidic resin is employed both in the step (a) of

pretreating as in the step (b) of decomposing the cumene hydroperoxide, in amounts comprised between 2% and 25% by weight with respect to the hourly flow rate of cumene hydroperoxide in each of the steps (a) of pretreating and (b) of decomposing, respectively.

6. A process according to claim 5, wherein said acidic resin is employed both in the step (a) of pretreating as in the step (b) of decomposing the cumene hydroperoxide, in amounts comprised between 5% and 15% by weight with respect to the hourly flow rate of cumene hydroperoxide in each of the steps (a) of pretreating and (b) of decomposing, respectively.

7. A process according to claim 6, wherein the amount of acidic resin is about 10% by weight with respect to the hourly flow rate of cumene hydroperoxide.

8. A process according to claim 1, wherein said acidic resin is chosen among ion exchange resins having sulphonic acid functional groups ($-SO_3H$) tied to an organic chain, preferably to a polystyrene or styrene-divinylbenzene polymer.

9. A process according to claim 8, wherein said acidic resin is chosen from the group Amberlyst™ 15, Amberlyst™ 18 and Nafion™.

10. A process according to claim 1, further comprising a step (c)of drawing a portion of the

reaction mixture exiting the decomposing step (b) of the cumene hydroperoxide, a step (d) of cooling said portion of the reaction mixture at a temperature of 35°C to 45°C, more preferably of about 40°C, and a step (e) of recirculating the same to the decomposing step (b).

11. A process according to claim 10, wherein the amount of product recycled according to steps (c), (d) and (e) is comprised between 80% and 95% by weight, preferably about 90% by weight of the reaction mixture exiting from the decomposing step (b).

12. A process according to claim 1, further comprising a regenerating step

for the acidic resin used in said step (a) of pretreating the cumene hydroperoxide.

13. A process according to claim 12, wherein said acidic resin regenerating step is performed by treating with a solution of sulphuric acid, preferably a sulphuric acid at 15% by weight.

14. A plant for performing the process as outlined in claim 1, comprising:

- a decomposing reactor (3) of the cumene hydroperoxide, containing a pre-established amount of acidic resin;

- at least one preatreatment reactor (1a, 1b) of the cumene hydroperoxide with said acidic resins,

where said at least one pretreating reactor is set up upstream of said decomposing reactor (3);

- recirculating means (D, P) of a portion of the products of the decomposing reaction to said decomposing reactor (3);

- optionally, heat exchanging means (5) set up downstream of said decomposing reactor (3) along the recirculating line of said portion of products of the decomposing reaction,

- optionally, cooling means of said decomposing reactor (3) and of said at least one pretreating reactor (1a, 1b).

15. A plant according to claim 14, comprising at least two pretreating reactors (1a, 1b) of cumene hydroperoxide with acidic resin, where said at least two pretreating reactors are set up in parallel and operating in an alternating manner.

"PROCESS FOR THE SYNTHESIS OF PHENOL AND ACETONE"

SUMMARY

This invention refers to a process for the synthesis of phenol and acetone starting from cumene hydroperoxide, and to a plant specifically developed for performing this process.

More in particular, this invention refers to a process for the synthesis of phenol and acetone starting from cumene hydroperoxide, comprising the following steps:

a) Pretreating of the starting cumene hydroperoxide with acidic resins, to obtain cumene hydroperoxide free of inorganic cations;

b) Decomposing of the cumene hydroperoxide free of inorganic cations originating from the step (a) in the presence of acidic resins, to yield phenol and acetone.